STATUTORY DECLARATION

I, Kazumi TAKANO, of Taiyo Seimei Otsuka Building 3F, 2-25-1, Kitaotsuka, Toshimaku, Tokyo, 170-0004, Japan, do solemnly and sincerely declare as follows:

I am well acquainted with the English and Japanese languages.

The attached translation is true into the English language of the accompanying certified copy of the document filed in the name of Fuji Photo Film Co., Ltd., in the Japanese Patent Office on 21 October 2002, in respect to an application for Patent.

This 17th day of November 2005,

Kazumi Takano

Kazumi TAKANO

JAPAN PATENT OFFICE

This is to certify that the annexed is a true copy of the following application as filed with this Office

Date of Application: 21 October 2002

Application Number: Pat. Appl. 2002-305515

Applicant(s): Fuji Photo Film Co., Ltd.

29 August 2003

Commissioner,

Japan Patent Office Yasuo IMAI

Certification Number 2003-3070684

[TITLE OF THE DOCUMENT] Patent Application

[REFERENCE NUMBER] P20021021A

[FILING DATE] 21 October 2002

[ATTENTION TO] Commissioner of the Patent Office

[INTERNATIONAL PATENT CLASSIFICATION] B41J 13/00

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[FEE]

[PREPAYMENT BOOK NUMBER] 011844

[PAID AMOUNT] 21,000

[LIST OF FILED DOCUMENTS]

[TITLE] Specification 1

[TITLE] Drawings 1

[TITLE] Abstract 1

[NECESSITY OF PROOF] Need

[TITLE OF DOCUMENT] Specification

[TITLE OF THE INVENTION] Thermal printer and thermal printing method

[Scope Of Claims]

[CLAIM 1] A thermal printer for performing line recording of an image on an entire surface of a thermosensitive recording material fed in a sub scan direction by using a thermal head, said thermal head including a heating element array composed of a plurality of heating elements linearly arranged in a main scan direction, said thermal printer characterized by comprising:

heating element specification means for detecting a lateral edge of said fed thermosensitive recording material to specify a heating element positioned at the vicinity of said lateral edge in said heating element array; and

control means for controlling said thermal head to record an image with said specified heating element at a distance equal to at least one line.

[CLAIM 2] A thermal printer as defined in claim 1, characterized in that said distance is changed based on contrasting density of an image recorded at the vicinity of said lateral edge.

[CLAIM 3] A thermal printing method for performing line recording of an image on an entire surface of a thermosensitive recording material fed in a sub scan direction by using a thermal head, said thermal head including a heating element array

composed of a plurality of heating elements linearly arranged in a main scan direction, said thermal printing method characterized by comprising the steps of:

detecting a lateral edge of said fed thermosensitive recording material to specify a heating element positioned at the vicinity of said lateral edge in said heating element array; and

recording an image with said specified heating element at a distance equal to at least one line.

[Detailed Description of the Invention]

[0001]

[TECHNICAL FIELD]

The present invention relates to a thermal printer. More particularly, the present invention relates to a thermal printer capable of performing printing without keeping blank margins, so called marginless printing.

[BACKGROUND ART]

[0002]

Thermal printers are known in each of which a thermal head including a heating element array composed of a plurality of heating elements linearly arranged in a main scan direction is used to move a thermosensitive recording material (hereinafter referred to as recording material) in a sub scan direction perpendicular to the thermal head, while an image is recorded line by line. The thermal head pressurizes the recording material and applies heat to the same, to develop color at a desired density and record the resultant. There is a platen roller opposed to the thermal head. The recording material is

subjected to the thermal recording while nipped between the thermal head and the platen roller.

[0003]

Among the thermal printers described above, there is a printer capable of full-width printing in which an image is recorded to the recording material in its full width without keeping a blank margin region on any of peripheral portions of the recording material to obtain a marginless print (see, Reference 1, for example). Although the recording material has a standardized size, an error is likely to occur in the size due to a tolerable range in the precision of the slitting or cutting. In view of this situation, the heating element array in the thermal printer has a length greater than the standardized width of the recording material. Also, a sensor is used for detecting a lateral end of the recording material, to specify a position of the heating element array associated with the lateral end. Thereby, an image is recorded.

[0004]

[Reference 1] Japanese Patent Laid-open Publication Number 9-272217

[0005]

[PROBLEMS TO BE SOLVED BY THE INVENTION]

However, as described above, the recording material is nipped between the thermal head and the platen roller. Accordingly, to the lateral edges of the recording material, heat from the thermal head is applied through lateral end surfaces (cross-sectional surfaces) of the recording material.

Therefore, there occurs a problem in that the density of the lateral edges is increased locally to result in occurrence of scorch.

[0006]

In view of the foregoing problems, an object of the present invention is to provide a thermal printer and a thermal printing method capable of preventing scorch on the lateral edges.

[0007]

[MEANS FOR SOLVING THE PROBLEMS]

To achieve the above object, according to the present invention, there is provided a thermal printer for performing line recording of an image on an entire surface of a thermosensitive recording material fed in a sub scan direction by using a thermal head. The thermal head includes a heating element array composed of a plurality of heating elements linearly arranged in a main scan direction. The thermal printer is characterized by including: heating element specification means for detecting a lateral edge of the fed thermosensitive recording material to specify a heating element positioned at the vicinity of the lateral edge in the heating element array; and control means for controlling the thermal head to record an image with the specified heating element at a distance equal to at least one line.

[0008]

A thermal printer as defined in claim 1 is characterized in that the distance is changed based on contrasting density of an image recorded at the vicinity of the lateral edge.

[0009]

According to the present invention, there is provided a thermal printing method for performing line recording of an image on an entire surface of a thermosensitive recording material fed in a sub scan direction by using a thermal head. The thermal head includes a heating element array composed of a plurality of heating elements linearly arranged in a main scan direction. The thermal printing method is characterized by including the steps of: detecting a lateral edge of the fed thermosensitive recording material to specify a heating element positioned at the vicinity of the lateral edge in the heating element array; and recording an image with the specified heating element at a distance equal to at least one line.

[0010]

[BEST EMBODIMENTS OF THE INVENTION]

FIG. 1 is a schematic view illustrating constitution of a color thermal printer of the present invention. A color thermal printer 10 is constituted by a first feed roller set 11, a second feed roller set 12, a third feed roller set 13, a line sensor 14, a thermal head 15, a photo fixer 16, a system controller 17, and the like. A recording material roll 18 is loaded in the color thermal printer 10. The recording material roll 18 is constituted by a color thermosensitive recording material 20 with a long length wound in a roll form. A pulse motor 19 causes the first, second, and third feed roller sets 11, 12, and 13 to rotate in both forward and backward directions, to nip and move back and forth the color thermosensitive

recording material 20 unwound from the recording material roll 18 to a feeding path. The system controller 17 controls rotation of the pulse motor 19 through a motor driver 21.

[0011]

A pulse counter 22 counts drive pulses sent to the pulse motor 19. Based on a counted result of the pulse counter 22, the system controller 17 specifies a start position of starting printing, a return position of returning the recording material, a cutting position of cutting the recording material, and the like. The pulse counter 22, while the pulse motor 19 rotates forwards, counts the drive pulses incrementally, and while the pulse motor 19 rotates backwards, counts the drive pulses decrementally.

[0012]

The color thermosensitive recording material 20, as is well known, includes cyan, magenta, and yellow thermosensitive coloring layers sequentially on a support. The yellow thermosensitive coloring layer as an uppermost layer has the highest sensitivity to heat, and develops a yellow color in response to heat energy of a comparatively low level. The cyan thermosensitive coloring layer as a lowermost layer has the lowest sensitivity to heat, and develops a cyan color in response to heat energy of a comparatively high level. When violet rays as yellow fixing light are applied at an emission wavelength with a peak of approximately 420 nm, coloring ability of the yellow thermosensitive coloring layer is destroyed. The magenta thermosensitive coloring layer develops a magenta color

in response to heat energy at a level between the levels for the yellow and cyan thermosensitive coloring layers. When near ultraviolet rays as magenta fixing light are applied at an emission wavelength with a peak of approximately 365 nm, coloring ability of the magenta thermosensitive coloring layer is destroyed.

[0013]

The thermal head 15 is disposed between the first and second feed roller sets 11 and 12. As illustrated in FIG. 2, a heating element array 15b constitutes the thermal head 15, and includes a plurality of heating elements 15a arranged linearly in a main scan direction. The heating element array 15b extends at a length slightly greater than a standard width of the color thermosensitive recording material 20. Accordingly, if the color thermosensitive recording material 20 has a width slightly greater than the standard width, it is possible to record an image on the color thermosensitive recording material 20 in a full-width manner without keeping blank margins.

[0014]

A platen roller 24 is disposed so that the feeding path for the color thermosensitive recording material 20 lies between the platen roller 24 and the heating element array 15b, and supports the color thermosensitive recording material 20. There is a pivot 25 about which the thermal head 15 is rotationally movable between a printing position and an offset position. The thermal head 15, when in the printing position, presses the color thermosensitive recording material 20 on the

platen roller 24, and when in the offset position, comes up away from the platen roller 24. The platen roller 24 supports the color thermosensitive recording material 20 from the below while the thermal head 15 applies pressure to the color thermosensitive recording material 20, and is caused to rotate in accordance with the feeding of the color thermosensitive recording material 20, to keep stability in the contact between the color thermosensitive recording material 20 and the heating element array 15b. An image is thermally recorded on the color thermosensitive recording material 20 in a state where the color thermosensitive recording material 20 is nipped between the thermal head 15 and the platen roller 24.

[0015]

The system controller 17 controls the thermal head 15 through a head driver 26 when the color thermosensitive recording material 20 is moved in the forward direction. The controlling drives each of the heating elements 15a in the heating element array 15b to generate heat at a predetermined temperature according to the printing data to be described later. Heat energy is applied to the color thermosensitive recording material 20 to develop colors on each of the coloring layers selectively.

[0016]

A bias mechanism 27 is disposed close to the thermal head 15, and pushes a first lateral edge 20a of the color thermosensitive recording material 20. A second lateral edge 20b of the color thermosensitive recording material 20 is

constantly kept in contact with a guide portion 28 by the biasing force of the bias mechanism 27. The thermal head 15 is disposed such that one end of the heating element array 15b is opposed to the lateral edge 20b.

[0017]

The line sensor 14 is disposed upstream from the thermal head 15 in the forward direction to face the lateral edge 20a of the color thermosensitive recording material 20. The line sensor 14 detects a position of the first lateral edge 20a of the color thermosensitive recording material 20, and sends the system controller 17 data of the position of the lateral edge. Also, the line sensor 14 is effective as a front edge detector to detect a front edge of the color thermosensitive recording material 20. The system controller 17 receives a detection signal from the line sensor 14, and responsively starts counting drive pulses to be sent to the pulse motor 19 to control a positioned state and moving amount of the color thermosensitive recording material 20 until the end of the printing operation.

[0018]

As shown in FIG. 2, the line sensor 14 has a CCD array 14b including a plurality of CCD elements 14a arranged at a pitch approximately equal to that of the heating elements 15a. There is a light projector 14c which is approximately opposed to the CCD array 14b and supplies incident light to the CCD array 14b. When the color thermosensitive recording material 20 moves past the CCD array 14b, the light from the light projector 14c is partially intercepted, so there occurs a change in a state of

receiving the light in each of the CCD elements 14a. The system controller 17 receives signals indicating the state of receiving the light sent from each of the CCD elements 14a, and determines a position of the lateral edge. It is to be noted that the line sensor may be a reflection type of sensor in which light is projected to the color thermosensitive recording material, and the light reflected by the color thermosensitive recording material is received to detect the position of the lateral edge.

[0019]

The photo fixer 16 includes a reflector 30, a yellow fixing lamp 31, and a magenta fixing lamp 32. The yellow fixing lamp 31 emits the yellow fixing light. The magenta fixing lamp 32 emits the magenta fixing light. A fixer driver 33 is caused by the system controller 17 to turn on the fixing lamps 31 and 32 respectively for destruction of the coloring ability of the recorded yellow and magenta thermosensitive coloring layers upon being heated again through the fixation of the recorded yellow and magenta thermosensitive coloring layers.

[0020]

A cutter 34 is positioned downstream from the photo fixer 16. When the printing and fixation of the color thermosensitive recording material 20 are completed, a printed portion of the color thermosensitive recording material 20 is moved to the cutter 34. The cutter 34 cuts away a front margin of the color thermosensitive recording material 20, and also the printed portion of the color thermosensitive recording material 20 in

a sheet form. The cut sheet of the printed portion is ejected to the outside of the printer. An unused portion of the color thermosensitive recording material 20 before the printing is wound back to the recording material roll 18.

[0021]

FIG. 3 is a block diagram illustrating electrical constitution of the color thermal printer 10. Various elements are connected with the system controller 17, including a printing data generator 36 and a frame memory 40, in addition to the line sensor 14 and the head driver 26 described above.

[0022]

An I/O port (not shown) is also included in the color thermal printer 10 for connection of external equipments of various types. An I/O circuit is connected with the I/O port. The I/O circuit is supplied with image data of the respective colors of red, green, and blue by the equipment connected with the I/O port, such as a digital camera, personal computer, and the like. The supplied image data is sent by means of the I/O circuit, and written to the frame memory 40.

[0023]

As shown in FIG. 2, based on the lateral edge position data, the system controller 17 specifies a heating element row 15c, and near-lateral edge elements 15d and 15e. The heating element row 15c is included in the heating element array 15b, and opposed to the color thermosensitive recording material 20 between the lateral edges 20a and 20b of the color thermosensitive recording material 20. The near-lateral edge elements 15d and 15e are

included in the heating elements 15a constituting the heating element row 15c, and located at the vicinity of each of the lateral edges 20a and 20b.

[0024]

The number of the heating elements 15a constituting the near-lateral edge elements 15d and 15e is suitably predetermined according to the size of the heating elements 15a, the pitch of arrangement of the heating elements 15a, and the like. Should the number of the heating elements 15a be too small, it will be necessary to raise precision in the detection of the lateral edge of the color thermosensitive recording material 20. This is likely to raise a manufacturing cost due to a need of a line sensor with very high quality. In contrast, should the number be too great, it will result in a conspicuously degraded portion with too low a density in the color. It follows that the number of the near-lateral edge elements 15d and 15e is preferably in a range of 3-9.

[0025]

As described above, density of recording is likely to be locally high on the lateral edges 20a and 20b of the color thermosensitive recording material 20, because heat from the thermal head 15 is applied thereto through lateral end surfaces (cross-sectional surfaces) of the color thermosensitive recording material 20. For the purpose of preventing occurrence of scorch due to the locally high density, the system controller 17 operates as illustrated in FIG. 4 to control the thermal head 15 for recording an image with the near-lateral edge elements

15d and 15e at a distance equal to one line. The vicinity of the lateral edges 20a and 20b develops each color with a density higher than the desired density, and therefore recording an image on one line regularly per two lines is effective in lowering the average density of the vicinity of the lateral edges 20a and 20b. For example, if a line number of the line is odd, one line image is fully recorded. If a line number is even, one line image is recorded only partially by suppressing recording of near-lateral edge pixels located at the vicinity of the lateral edges 20a and 20b. It is of course possible to suppress recording of the near-lateral edge pixels at the odd line numbers, and to record a line image fully at the even line numbers.

[0026]

The image data is read from the frame memory 40, and written to a line memory 50 line by line for each of the colors. The printing data generator 36 produces printing data for driving each of the heating elements 15a according to the image data written to the line memory 50.

[0027]

The printing data generator 36 is controlled upon a command signal generated by the system controller 17, and produces printing data assigned to each of the heating elements 15a included in the heating element row 15c. The printing data generator 36 corrects the received image data for one line regularly per two lines so as to record an image with the near-lateral edge elements 15d and 15e at a distance equal to

one line, thus producing the printing data.

[0028]

The printing data after the correction is sent to the head driver 26. The head driver 26 is controlled by the system controller 17 and causes each of the heating elements 15a in the thermal head 15 to generate heat according to the received printing data, to record an image on each of the thermosensitive coloring layers of the color thermosensitive recording material 20 thermally. The near-lateral edge pixels are recorded in one line per two lines. The average density in the portions of the lateral edges 20a and 20b is lowered, to prevent occurrence of scorch.

[0029]

The operation of the above constitution is described by referring to flowcharts of FIGS. 5 and 6. To produce a print from the color thermosensitive recording material 20 by use of the color thermal printer 10 of the present invention, at first the color thermal printer 10 is connected with a digital camera, a computer, or the like for communication. Then, one image to be printed is selected. A command signal for printing is input to the color thermal printer 10, to start the printing operation.

[0030]

Image data of a designated image is input to the color thermal printer 10 by means of the I/O circuit, and written to the frame memory 40 for each of the colors. After the image data is input, the system controller 17 causes the motor driver 21 to rotate the pulse motor 19 in the forward direction. The pulse

motor 19 causes the first, second, and third feed roller sets 11, 12, and 13 to rotate in the forward direction, to move the color thermosensitive recording material 20 forwards for feeding. At this time, the thermal head 15 is set in the offset position so as not to block the color thermosensitive recording material 20 in the movement. The pressure of the bias mechanism 27 keeps the lateral edge 20b of the color thermosensitive recording material 20 in contact with the guide portion 28 constantly while the color thermosensitive recording material 20 is moved.

[0031]

When the color thermosensitive recording material 20 reaches the line sensor 14, the line sensor 14 detects a position of the lateral edge 20a of the color thermosensitive recording material 20, and sends the lateral edge position data to the system controller 17. Upon receiving the lateral edge position data, the system controller 17 starts counting the drive pulses that are input to the pulse motor 19. According to the lateral edge position data, the system controller 17 specifies the near-lateral edge elements 15a and 15d. Data of the specified near-lateral edge elements 15a and 15d are sent to the printing data generator 36.

[0032]

When a front end of a recording area of the color thermosensitive recording material 20 reaches the heating element array 15b, the thermal head 15 is shifted to the printing position. According to the process shown in the flowchart of

FIG. 6, recording of yellow image is started. The image data is read from the frame memory 40, and written to the line memory 50 line by line.

[0033]

The printing data generator 36 reads image data for one line from the line memory 50, and produces printing data. If the line number of the line is odd, printing data is produced such that the line image is fully recorded. If the line number of the line is even, the image data is corrected to suppress printing of the near-lateral edge pixels, thus producing printing data. According to the printing data produced by the printing data generator 36, the thermal head 15 is driven to record the image one line after another. After printing for a first line, the color thermosensitive recording material 20 is moved forward by an amount of one line. Similarly, printing data is produced according to the above process, to record a second line image. The operation of the line image recording is repeatedly effected until an image of one frame is recorded. As illustrated in FIG. 4, the near-lateral edge pixels of the recorded image are thinned regularly for one line per two lines. Thus, occurrence of scorch at the vicinity of lateral edge in the recorded image can be suppressed.

[0034]

After the yellow image is thermally recorded, the thermally recorded portion of the color thermosensitive recording material 20 is moved to the photo fixer 16 serially, and subjected to the yellow optical fixation. After the yellow

image is thermally recorded and subjected to the optical fixation, the unwound portion of the color thermosensitive recording material 20 is once wound back. When the front end of the recording area comes again to the thermal head 15, the color thermosensitive recording material 20 starts being moved in the forward direction again, to start recording the magenta image thermally.

[0035]

The recording of magenta image is effected according to the above process shown in FIG. 6 as in the case of yellow image. When the recording of magenta image is completed, the magenta color is subjected to the optical fixation. The color thermosensitive recording material 20 is moved backwards again, before a cyan image is recorded. The cyan image is also recorded according to the above process shown in FIG. 6 as in the case of yellow and magenta images. After the printing is completed, a printed portion of the color thermosensitive recording material 20 is moved to the cutter, which cuts the same from the color thermosensitive recording material 20 in a sheet form, and then ejected.

[0036]

In the above embodiments, the near-lateral edge pixels are recorded in one line regularly per two lines. However, it is possible to record the near-lateral edge pixels at a distance equal to a plurality of lines. It is likely that scorch occurs should the density of an image be very high, and that a conspicuously degraded portion with too low a density in the

color occurs should the density be very low. Accordingly, it is preferable to change the distance for image recording based on the contrasting density of the near-lateral edge pixels.

[0037]

For this purpose, an image data analyzer 51 and an LUT 52 are used as illustrated in FIG. 7. The image data analyzer 51 analyzes the image data being input, and analyzes the contrasting density of near-lateral edge pixels. The LUT 52 stores table data which is constituted by the image density level and the distance for image recording combined with each other. An example of a set of the image density levels is a three-staged categorization including a high density of rank A, an intermediate density of rank B, and a low density of rank C. According to each of the density levels, the line number indicating distances for image recording are predetermined.

[0038]

The image data analyzer 51 reads the near-lateral edge pixels for all the lines and obtains average density thereof. A system controller 53 accesses the LUT 52, and checks in which of the ranks the obtained average density falls, so as to determine the distance for image recording (the number of the lines). If the average density is in the range of rank A with the high density, then the distance for image recording is determined as three lines. If the average density is in the range of rank C with the low density, then the distance for image recording is determined as one line. Furthermore, it is possible to change the distance for image recording based on the local

contrasting density of the image instead of keeping the distance for image recording constant during recording of one frame. This is effective in recording an image with a preferable distance.

[0039]

In the above embodiments, a printer specialized for marginless printing is taken as an example for explanation, however there may be used a printer in which both printing without a margin and printing with a margin can be performed, and the selection of these two kinds of printing may be selected in starting printing.

[0040]

In the above embodiments, one lateral edge of the recording material is guided by the guide portion, and the position of the other lateral edge is detected by the line sensor, so as to specify the heating elements associated with the lateral edges of the recording material. However, a plurality of line sensors may be used to detect respectively the lateral edges of the recording material for the purpose of specifying the near-lateral edge heating elements. Additionally, the lateral edge of the recording material is detected for one time by the line sensor in the course of feeding. However, the line sensor may detect the lateral edge for each time for the respective colors.

[0041]

In the above embodiments, the recording material with a long length is used to print an image data, however the recording material cut in a sheet form in advance may also be used.

[0042]

In the above embodiments, the thermal printer including the single thermal head for thermally recording each of the colors is taken as an example for explanation. However, the present invention is also applicable to a thermal printer including a plurality of thermal heads for each of the colors, to print a full-color image by one-time feeding of the recording material.

[0043]

[EFFECT OF THE INVENTION]

As described above, according to the present invention, a thermal head including a heating element array composed of a plurality of heating elements linearly arranged in a main scan direction is used to perform line recording of an image on an entire surface of a thermosensitive recording material fed in a sub scan direction. At this time, the lateral edge of the fed thermosensitive recording material is detected to specify a heating element positioned at the vicinity of the lateral edge in the heating element array. Thereafter, the thermal head is controlled to record an image with the specified heating element at a distance equal to at least one line. Accordingly, it is possible to prevent occurrence of scorch in marginless printing.

[BRIEF DESCRIPTION OF THE DRAWINGS]

[Figure 1] A schematic view illustrating constitution of a color thermal printer of the present invention.

[Figure 2] A schematic view illustrating constitution of regions of a thermal head and a line sensor.

[Figure 3] A block diagram illustrating electrical constitution of the thermal printer.

[Figure 4] An explanatory view illustrating a printing area at the vicinity of lateral edges (non-printing area).

[Figure 5] A flowchart illustrating a printing process.

[Figure 6] A flowchart illustrating a process of recording an image.

[Figure 7] A block diagram illustrating electrical constitution of a thermal printer of another embodiment.

[DESCRIPTION OF THE REFERENCE NUMBERS]

[0039]

10 color thermal printer

14 line sensor

15 thermal head

17 system controller

20 color thermosensitive recording material

36 printing data generator

40 frame memory

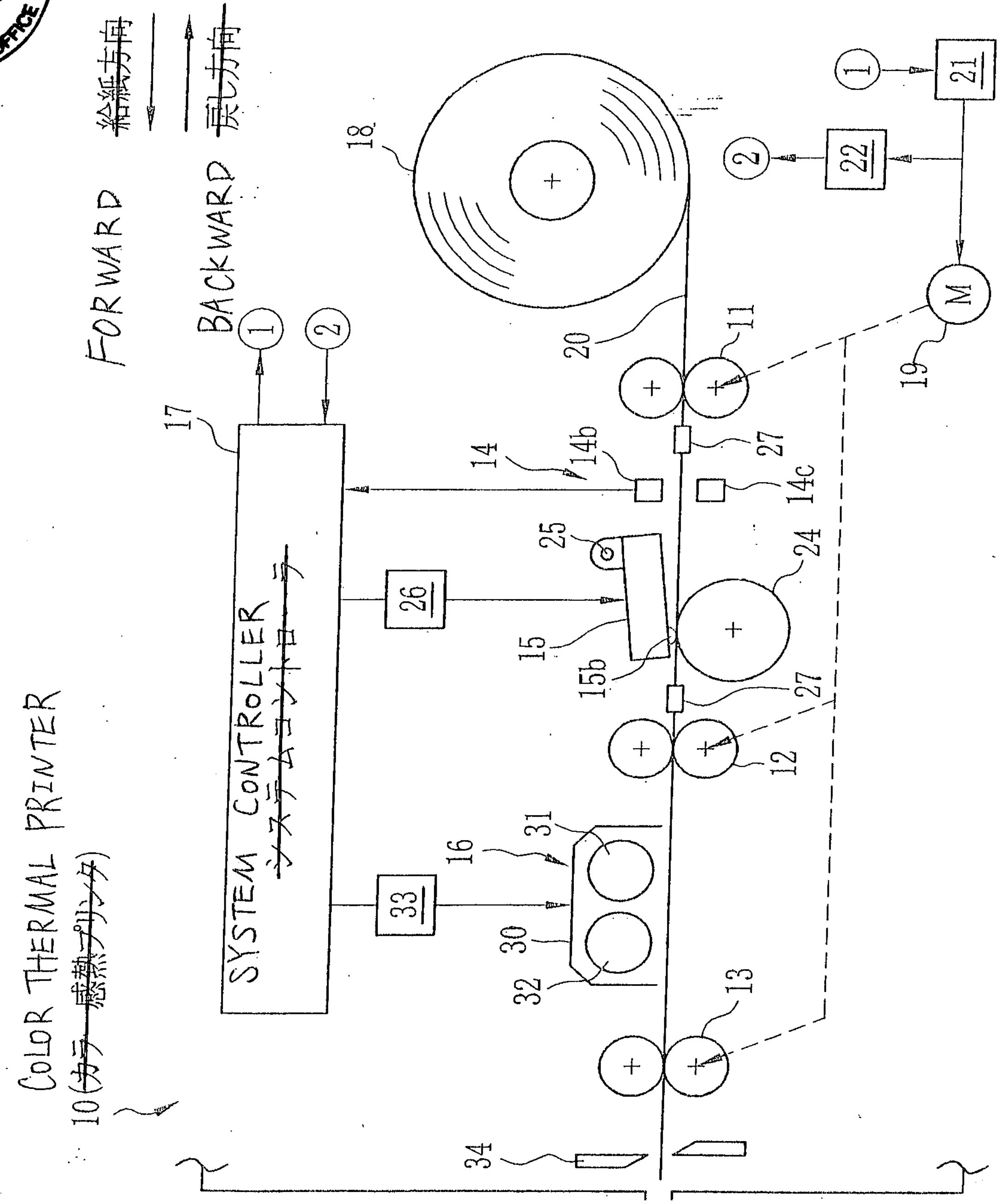
50 line memory

51 image data analyzer

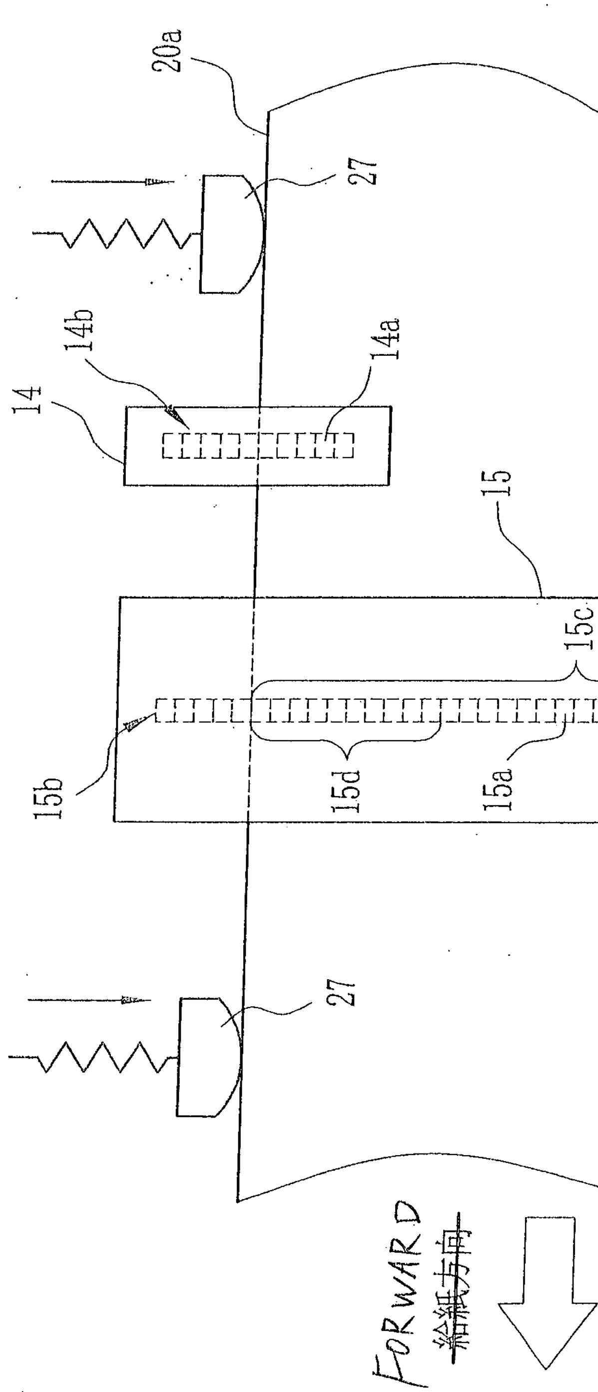
52 LUT

~~【書類名】~~ ~~図面~~ [DOCUMENT NAME] DRAWING

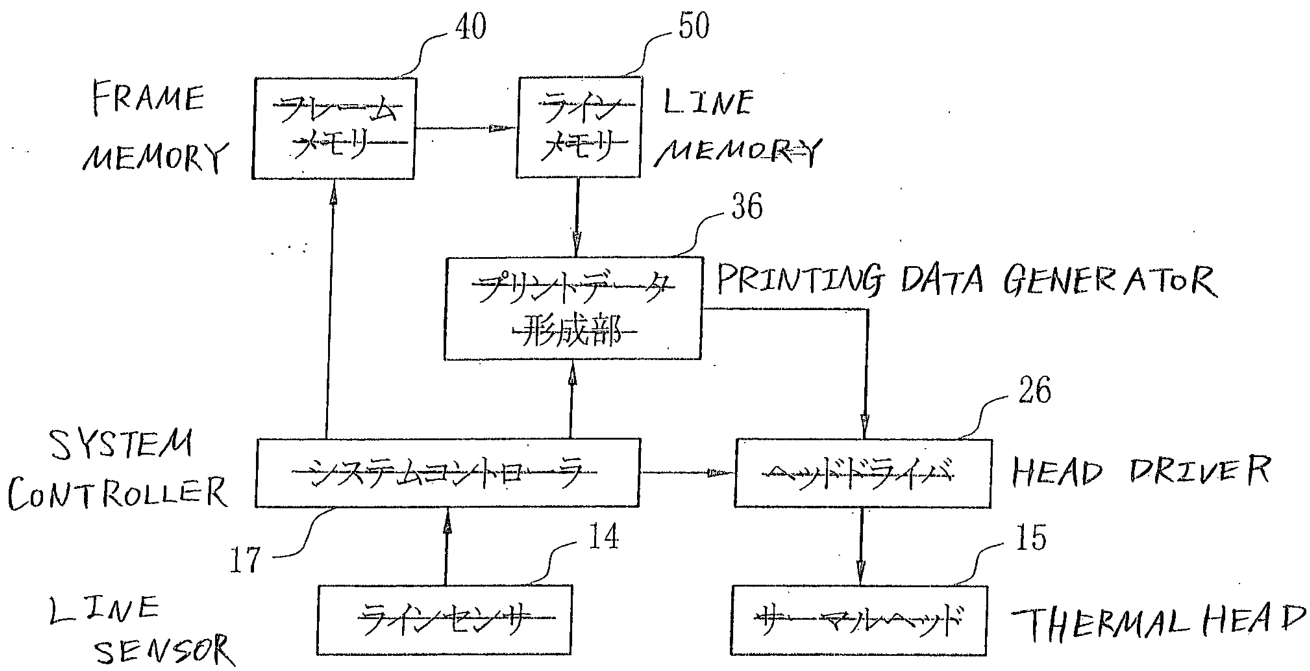
~~【図１】~~ [FIGURE 1]



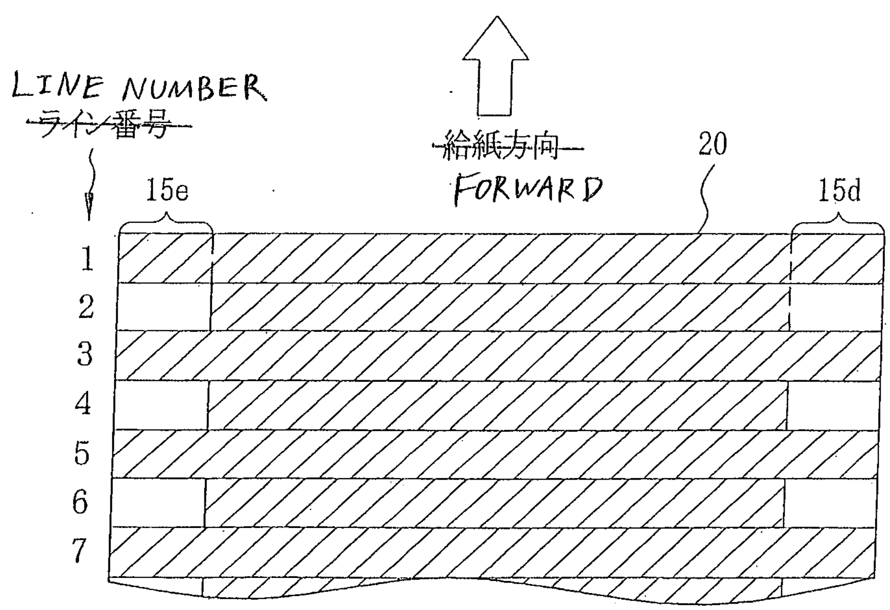
~~【図２】~~ [FIGURE 2]


20a
20
20b
27
14b
14a
14
28
15
15c
15b
15d
15a
15e
27
FORWARD
~~給紙方向~~

~~【図３】~~ [FIGURE 3]

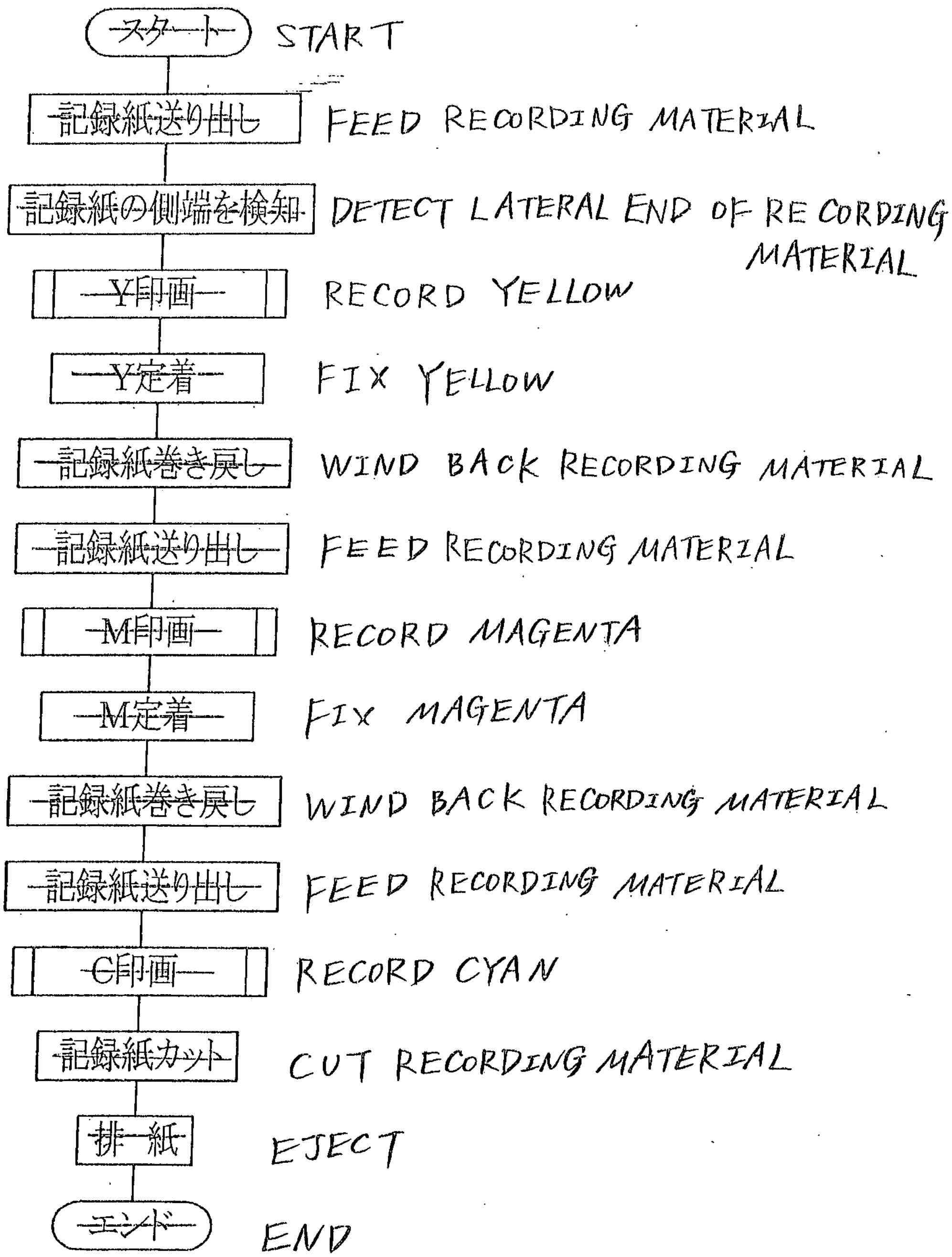


~~【図４】~~ [FIGURE 4]



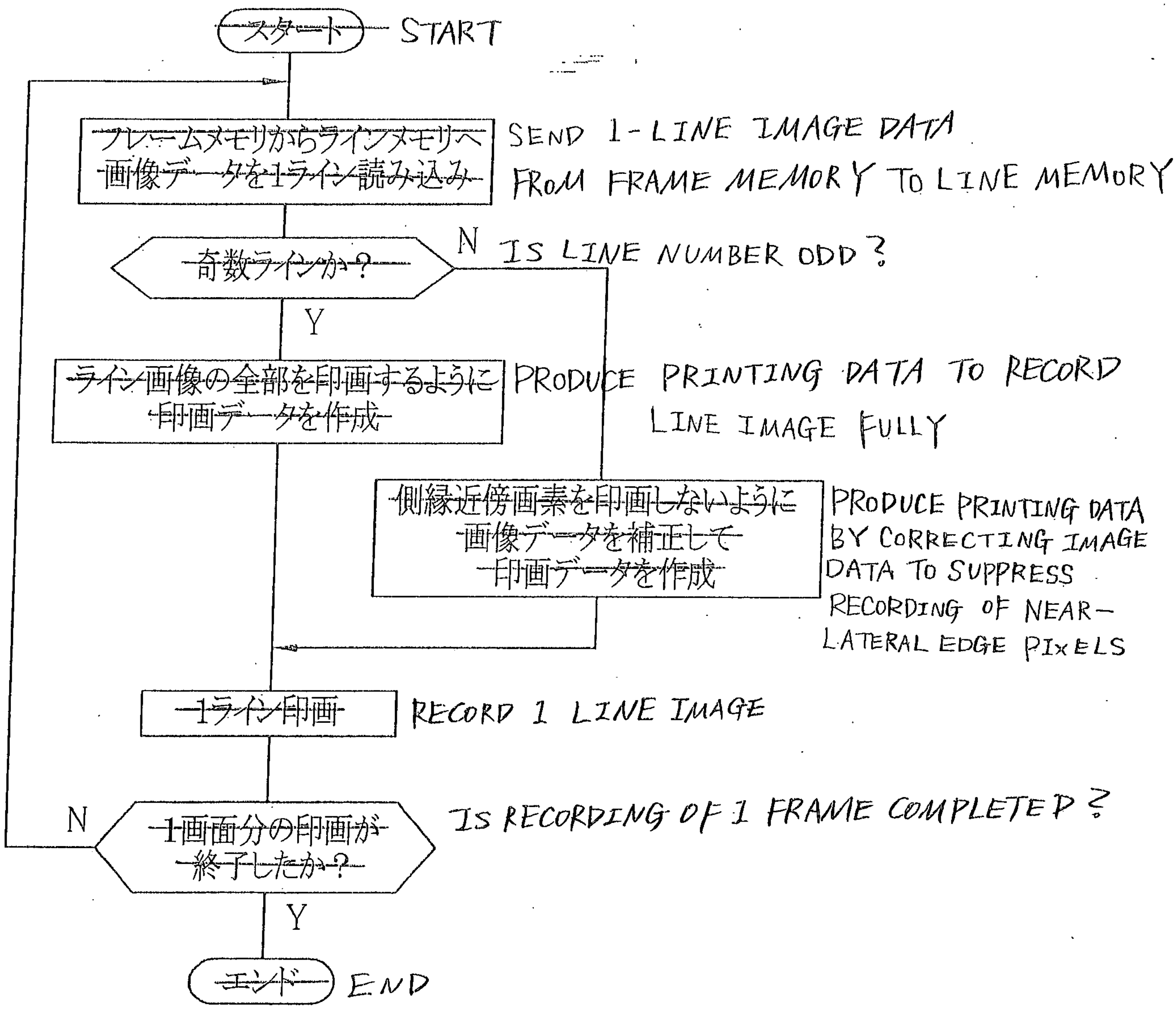
~~【図５】~~ [FIGURE 5]

~~<プリント手順>~~ <PRINTING PROCESS>

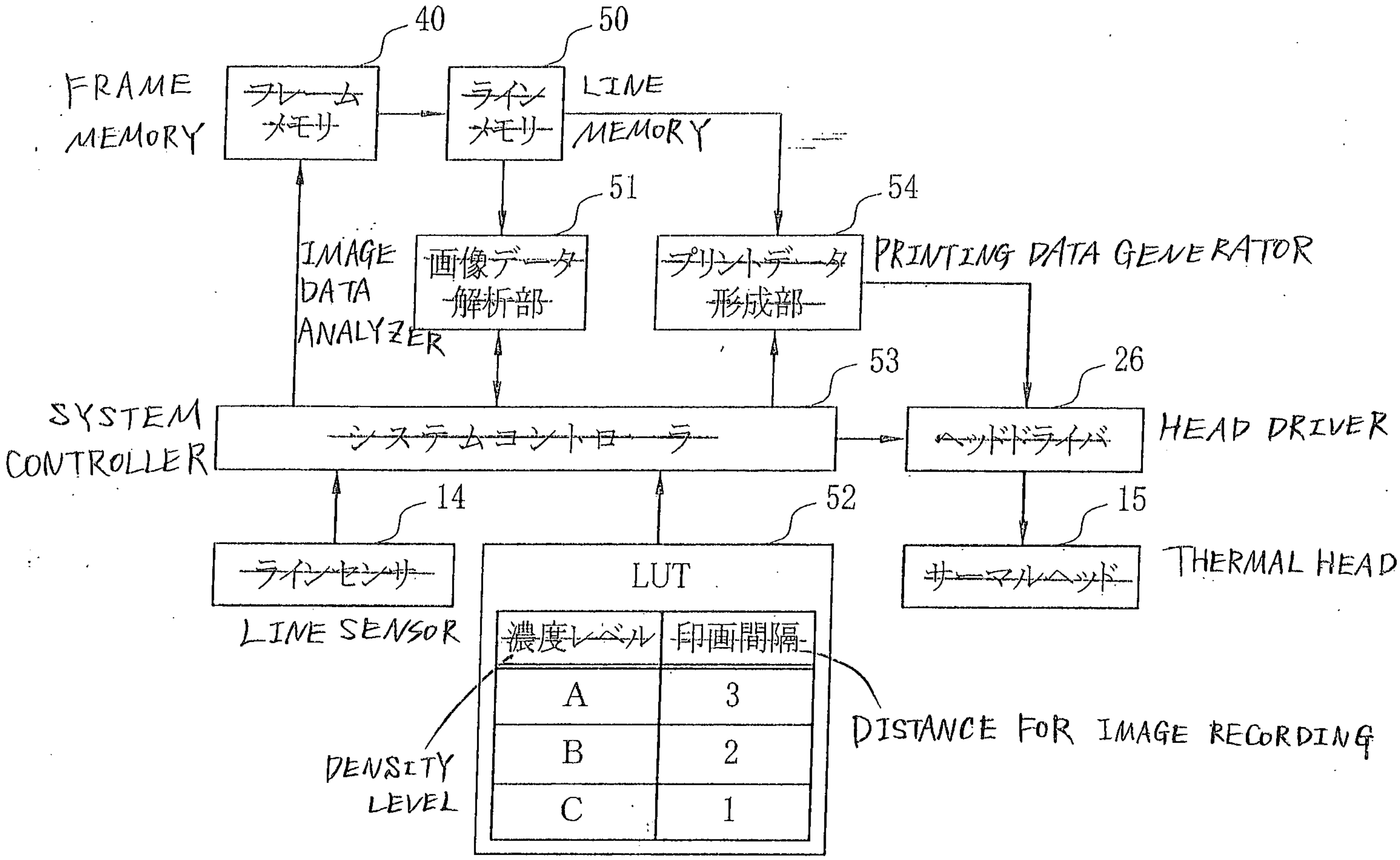


~~【図６】~~ [FIGURE6]

~~<印画手順>~~ PROCESS OF RECORDING IMAGE



~~【図７】~~ [FIGURE 7]


40
50
FRAME MEMORY
~~フレームメモリ~~
~~ラインメモリ~~
LINE MEMORY
51
54
IMAGE DATA ANALYZER
画像データ解析部
~~プリントデータ形成部~~
PRINTING DATA GENERATOR
53
26
SYSTEM CONTROLLER
~~システムコントローラ~~
~~ヘッドドライバ~~
HEAD DRIVER
14
52
15
~~ラインセンサ~~
LINE SENSOR
LUT
~~サーマルヘッド~~
THERMAL HEAD
濃度~~レベル~~
~~印画間隔~~
A 3
B 2
C 1
DENSITY LEVEL
DISTANCE FOR IMAGE RECORDING

[TITLE OF DOCUMENT] Abstract

[ABSTRACT]

[OBJECT] Preventing occurrence of scorch on a lateral edge of a recording material in marginless printing using a thermal head.

[RESOLUTION] A line sensor disposed upstream from a thermal head is used to detect a lateral edge of a recording material and specify a heating element positioned at the vicinity of the lateral edge of the recording material based on the position of the lateral edge. Image data to be recorded is changed to printing data line by line, and based on the printing data, the thermal head is heated to record an image to the recording material while feeding the recording material. At this time, when the number of lines of the image data is odd, the image data is corrected such that the line image is fully recorded, and when the number of lines of the image data is even, the image data is corrected to prevent the specified near-lateral edge heating elements from being heated. Accordingly, the printing data for each of the lines is produced.

[ELECTED FIGURE] Figure 6